beech-maple forests of the Chicago region. Thus it is possible to make rather accurate comparisons of the conditions within the forests of the east and the west and to obtain quantitative demonstration of the equal mesophytism of the latter.

The differences in the evaporating power of the air in the different associations are found to be quite sufficient to show that this factor must be an important one in causing succession. Such accumulations of quantitative data as are contained in the present paper mark the advance of ecology along lines tending toward greater exactness, and it is to be hoped that they will become increasingly numerous.—GEO. D. FULLER.

Phylogeny of Filicales.—In continuing his studies of the Filicales, BOWER[29] has investigated *Blechnum* and its allies, and finds that the characters of the sori are of most importance in suggesting phylogenetic lines. The genus is treated in its wider sense, as comprising the subgenera *Lomaria*, *Salpichlaena*, and *Eu-Blechnum*. In *Lomaria* the indusium appears marginal, while in *Eu-Blechnum* it becomes apparently intramarginal owing to the formation of a new structure which BOWER calls the "flange." He produces evidence from a comparison of the development in numerous species that the protective organ is phyletically the same throughout the genus *Blechnum*, and he calls it the "phyletic margin." The general conclusions reached are as follows.

The *Blechnum*-like ferns and their derivatives represent a true phyletic sequence, which is traced to the region of the Cyatheaceae, the actual point of contact probably being *Matteuccia intermedia*, a fern of North China recently described by CHRISTENSEN. From this source several divergent lines have proceeded, the main line leading through § *Lomaria* to *Eu-Blechnum*, involving the origin of the "flange" and the diversion of the "phyletic margin" to indusial functions. Minor lines led to *Acrostichum*-like derivatives in *Stenochlaena* and *Brainea*. Interruption of the fusion sorus, occurring as an anomaly in *Blechnum*, led to the conditions shown in *Woodwardia* and *Doodia*. An outward arching of the fusion sorus of *Blechnum*, ultimately combined with interruption, gives the key to the origin of *Scolopendrium*. An outward swinging of the interrupted fusion sori, variously combined with archings and new formations of partial sori, and various branchings of the leaf, give the several types of *Asplenium*. The relation of *Plagiogyria* to the whole series is regarded as problematical, but it is suggested that it is an isolated and relatively primitive genus.—J. M. C.

Evolution of inflorescence.—PARKIN[30] has studied inflorescence from the evolutionary point of view, a subject which in his judgment has been "strangely

[29] BOWER, F. O., Studies in the phylogeny of the Filicales. IV. *Blechnum* and allied genera. Ann. Botany **28**: 363–431. *pls. 22–32. figs. 26.* 1914.

[30] PARKIN, J., The evolution of the inflorescence. Jour. Linn. Soc. Bot. **42**: 511–563. 1914.

neglected." Textbooks define inflorescences, but there has been no serious attempt to relate them from the standpoint of their evolution. Some of the conclusions from his comparative studies are as follows: flowers were originally borne on the plant singly, each terminal to a leafy shoot; from such a shoot, bearing foliage leaves below and ending in a single terminal flower, all inflorescences, as well as the solitary axillary flower, have probably arisen; two main classes of flower clusters are distinguished, which are named "apical" and "intercalary," the majority of inflorescences belonging to the former class, which includes the long recognized cymose and racemose types. The author carries these preliminary propositions forward into details as to how the various clusters have arisen. For example, the first flower cluster to arise from the solitary terminal flower is said to have been cymose in character. From this start various tendencies are traced, and among the results it follows that racemose inflorescences have proceeded from cymose ones, the panicle being the intermediate stage. In regard to the origin of solitary axillary flowers, the author proposes at least three different ways, all capable of being traced back to the solitary terminal flower. Throughout the presentation the genera showing the various stages in this evolution are cited.—J. M. C.

Ant plants.—ESCHERICH[31] adds further evidence against the now generally discredited theory of myrmecophily, through a study of *Humboldtia laurifolia*, one of SCHIMPER's typical myrmecophilous plants. Not only do the ants of *Humboldtia* offer it no protection, but they actually bring it harm by attracting woodpeckers. ESCHERICH notes that ants collect and store the bulbs of *Cyperus bulbosus*, and thus may be of significance in the dispersal of the species.

MIEHE[32] has carried on some interesting investigations on *Myrmecodia tuberosa*, one of the most famous of all "myrmecophilous" plants. It appears that the internal walls of the hollow tuber of this plant are in part smooth and yellow and in part warty and black. In the black warty areas the ants (*Iridomyrmex Myrmecodiae*) deposit their excrements, whereas they deposit their eggs in the smooth areas. The black patches owe their color to luxuriant growths of fungi, which doubtless get nourishment from the ant excrements. Possibly the ants use the fungi (which may be *Cladosporium* or *Cladotrichum*) as a source of food, since tufts of mycelia were frequently seen to be shaved off. The warty tracts develop independently of either ants or fungi and are pretty clearly shown to be organs of water absorption. MIEHE believes that the organization of these tubers was related originally to water absorption and accumulation, the ant relation being secondary and incidental.—H. C. COWLES.

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[31] ESCHERICH, K., Zwei Beiträge zum Kapitel "Ameisen und Pflanzen." Biol. Centralbl. **31**:44–51. *figs. 2.* 1911.

[32] MIEHE, H., Untersuchungen über die javanische *Myrmecodia.* In Javanische Studien. Abhandl. Königl. Sächs. Gesells. Wiss. **32**:312–361. 1911.

———, Über die javanische *Myrmecodia* und die Beziehung zu ihren Ameisen. Biol. Centralbl. **31**:733–738. 1911.